



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------------|-------------|----------------------|------------------------|------------------|
| 10/717,590 | 11/21/2003 | Robert C. Tonks | 117738 | 9388 |
| 25944 | 7590 | 04/20/2005 | EXAMINER | |
| OLIFF & BERRIDGE, PLC | | | VERDIER, CHRISTOPHER M | |
| P.O. BOX 19928 | | | | |
| ALEXANDRIA, VA 22320 | | | ART UNIT | PAPER NUMBER |
| | | | 3745 | |

DATE MAILED: 04/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) |
|------------------------------|-----------------|------------------|
| | 10/717,590 | TONKS, ROBERT C. |
| Examiner | Art Unit | |
| Christopher Verdier | 3745 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on ____.

2a) This action is **FINAL**. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-17 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) Claim(s) _____ is/are allowed.

6) Claim(s) 1-7 and 9-17 is/are rejected.

7) Claim(s) 8 is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on 21 November 2003 is/are: a) accepted or b) objected to by the Examiner.

 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some * c) None of:

1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) Notice of References Cited (PTO-892)
2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 11-21-03

4) Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ .

5) Notice of Informal Patent Application (PTO-152)

6) Other: ____ .

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the further centrifugal stage (claim 1, line 3), the bearing support means connected to the casing through the diffuser section (claim 5), the bearing means additionally comprising a thrust bearing (claim 8), the turbo-fan engine (claim 14), and the turbo-jet engine (claim 14) must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "62" has been used to designate both the bypass support vanes and the bearing support radial part. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

The drawings are objected to under 37 CFR 1.84(i), because the drawing figure shows two different views in the same figure; note the sectional portions of vane 54 (adjacent reference numerals 66 and 54) which should not be shown in the view of figure 1. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the

remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The abstract of the disclosure is objected to because it is more than one paragraph, because it uses the legal terms "means" (lines 4, 6, 7, and 10) and "said" (line 10), which must be deleted, and because in line 9, "frusta-conical" should be changed to -- frusto-conical --. . . Correction is required. See MPEP § 608.01(b).

The disclosure is objected to because of the following informalities: Appropriate correction is required.

On page 1, line 2 should end with a period.

On page 3, fourth paragraph, lines 3-6 are non-idiomatic.

Reference numeral "62" has been used to refer to both the bypass support vanes and the bearing support radial parts. See page 6, paragraph 2, last line; page 6, last paragraph, second and third lines, and page 7, line 2.

Claim Objections

Claims 4 and 6 are objected to because of the following informalities: Appropriate correction is required.

In claim 4, line 2, "frusta-conical" should be changed to -- frusto-conical --.

In claim 6, lines 2-3, "there between" should be changed to -- therebetween --.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 13-14 and 16-17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 13, line 1 refers to "the said origin". It is unclear what the term "said origin" refers to, because the claims from which it depends do not use this term, and the specification does not use this term.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3-6, 12-13, and 15-16 (as far as claims 13 and 16 are understood and are definite) rejected under 35 U.S.C. 102(b) as being anticipated by Nguyen Duc 6,220,816 (figures 1-2). Note the compressor for a gas turbine engine (column 4, lines 61-63), the compressor comprising a casing 1, a bearing means 23, a bearing support means (the unnumbered hatched piece between the diffuser 10 and the bearing means 23), a mixed flow stage including a first rotor 31 and at least one further mixed flow stage including a second rotor 55 axially spaced apart from the first rotor, with all of the rotors being carried on a common shaft 22 rotatably mounted by the bearing means with respect to the bearing support means, with the bearing means being positioned between the first and second rotors for rotatably mounting the rotors with respect to the casing. The bearing support means extends radially with respect to the shaft between the bearing means and the casing. The bearing support means comprises a frusto-conical portion extending from the bearing means towards the casing (note the frusto-conical formed by the return channels 11-20 as shown in figure 2). A diffuser section 10 is located between the rotors, and the bearing support means is connected to the casing 1 through the diffuser section 10. The diffuser section has an unnumbered inlet section and an unnumbered outlet section with a radially inward flow section therebetween. The arrangement is broadly considered to be a gas turbine engine, because it is a turbomachine having the compressor section and turbine sections 32, 33 and the compressor functions to compress gas. Because all of the compressor stages and turbine sections are located on the same shaft, the engine is a single spool engine. The recitation in claims 15 and 16 of the engine being for an aircraft is a recitation of intended use. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably

distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. See *In re Casey*, 370 F.2d 576, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 312 F.2d 937, 939, 136 USPQ 458, 459 (CCPA 1963).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, 5-7, 12, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over United Kingdom Patent 689,353 in view of Youssef 6,488,469. The United Kingdom Patent (figure 1) discloses a compressor of a gas turbine engine for jet propulsion of an aircraft, the compressor comprising a casing 40, a bearing means A (see the marked up figure at the end of the action), a bearing support means B, a mixed flow stage including a first rotor 10 (note that the rotor 10 is not purely radial and has a mixed flow component) and at least one further centrifugal stage including a second rotor 11 axially spaced apart from the first rotor, with shafts 12, 13 rotatably mounted by the bearing means with respect to the bearing support means, with the bearing means being positioned between the first and second rotors for rotatably mounting the rotors with respect to the casing. The bearing means is positioned closely adjacent the first

Art Unit: 3745

rotor, and the bearing support means extends radially with respect to the shaft between the bearing means and the casing. A diffuser section 20-22 is located between the rotors, and the bearing support means is connected to the casing 40 through the diffuser section 20-22. The diffuser section has an unnumbered inlet section and an unnumbered outlet section with a radially inward flow section therebetween. The bearing means is shaped as a conventional journal bearing.

However, the United Kingdom Patent does not disclose that the rotors 10, 11 are carried on a common shaft.

Youssef (figure 1) shows a gas turbine engine having two stages 1 and 2, the first stage 1 being a mixed flow stage, and the second stage 2 being a centrifugal stage, mounted on a common shaft 4, for the purpose of simplifying assembly of the gas turbine engine by reducing the number of shafts.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the gas turbine engine of United Kingdom Patent 689,353 such that the rotors 10, 11 are carried on a common shaft, as taught by Youssef, for the purpose of simplifying assembly of the gas turbine engine by reducing the number of shafts.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over United Kingdom Patent 689,353 and Youssef 6,488,469 as applied to claim 1 above, and further in view of Aue

2,474,410. The modified compressor of the United Kingdom Patent shows all of the claimed subject matter except for the compressor being a two stage mixed flow compressor having two mixed flow stages.

Aue (figure 1) shows a compressor for a gas turbine engine having two mixed flow stages 2, 2' adjacent one another, for the purpose of forming a gas turbine engine with high pressure ratios.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified compressor of United Kingdom Patent 689,353 such that it is a two stage mixed flow compressor having two mixed flow stages, as taught by Aue, for the purpose of forming a gas turbine engine with high pressure ratios.

Claims 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over United Kingdom Patent 689,353 and Youssef 6,488,469 as applied to claim 1 above, and further in view of Fujino 4,224,010. The modified compressor of the United Kingdom Patent shows all of the claimed subject matter except for the compressor stages having substantially the same pressure ratio (claim 10), and except for the pressure ratio of each stage being greater than 4:1 (claim 11).

Fujino (column 1, lines 1-40) states that in multistage turbocompressors having diagonal flow or mixed flow, a pressure ratio of approximately two is selected for each stage, which

means that the pressure ratio of each stage is substantially the same, for the purpose of obtaining a desired level of performance and discharge pressure for the compressor.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified compressor of United Kingdom Patent 689,353 such that the compressor stages have substantially the same pressure ratio, as taught by Fujino, for the purpose of obtaining a desired level of performance and discharge pressure for the compressor.

The recitation in claim 11 of the pressure ratio of each stage being greater than 4:1 is a matter of choice in design. Applicant has not disclosed that this specific pressure ratio solves any stated problem or is for any particular purpose, and it would have been obvious at the time the invention was made to a person having ordinary skill in the art to select/specify a numerical value of the pressure ratio for each stage of the compressor, for the purpose of obtaining a desired level of performance and discharge pressure for the compressor.

Claims 13-14 and 16-17 (as far as they are understood and are definite) are rejected under 35 U.S.C. 103(a) as being unpatentable over United Kingdom Patent 689,353 and Youssef 6,488,469 as applied to claim 12 above, and further in view of Wislicenus 2,640,319. The modified compressor of the United Kingdom Patent shows all of the claimed subject matter including the engine comprising a turbo-jet engine (see United Kingdom Patent 689,353 at column 1, lines 12-15), but does not show the engine being a single spool engine, because turbines 14, 15 are mounted on separate shafts.

Wislicenus (figures 1, 1A, and 1B) shows a gas turbine engine having all stages 11, 14, 63, and 64 carried by a single spool/shaft 12, for the purpose of simplifying assembly of the gas turbine engine by reducing the number of shafts.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified compressor/gas turbine engine of United Kingdom Patent such that it is a single spool engine, as taught by Wislicenus, for the purpose of simplifying assembly of the gas turbine engine by reducing the number of shafts.

Allowable Subject Matter

Claim 8 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher Verdier whose telephone number is (571) 272-4824. The examiner can normally be reached on Monday-Friday from 10:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward K. Look can be reached on (571) 272-4820. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

C.V.
April 16, 2005

Christopher Verdier
Christopher Verdier
Primary Examiner
Art Unit 3745

FIG.1

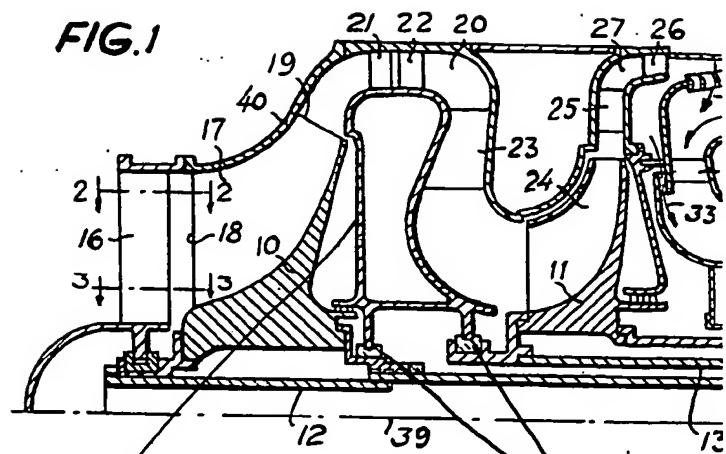


FIG.2



FIG.3



FIG.5 A



FIG.6 B



FIG.

